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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,576	02/12/2004	Toshiharu Furukawa	ROC920030271US1	6152
30206	7590	11/03/2005		
IBM CORPORATION ROCHESTER IP LAW DEPT. 917 3605 HIGHWAY 52 NORTH ROCHESTER, MN 55901-7829			EXAMINER LOKE, STEVEN HO YIN	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/777,576	FURUKAWA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Steven Loke	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 August 2005 and 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 9-13 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 17 is/are rejected.
- 7) ☒ Claim(s) 14-16, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>2/12/04, 9/19/05</u>  | 6) <input type="checkbox"/> Other: _____                                    |

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1. Applicant's election without traverse of species 1 (claims 1-8, 10, 11 and 14-20) in the reply filed on 8/18/05 is acknowledged.
2. Claims 9, 12 and 13 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 8/18/05. However, claims 10, 11 and 20 are also withdrawn from consideration because they are directed to Species 3.
3. The abstract of the disclosure is objected to because the abstract should direct to only the structure of the transistor instead of the method for forming the transistor. Correction is required.
4. Claims 2 and 15 are objected to because of the following informalities: Claim 2, line 2, the phrase "said conductive carbon nanotube" has no antecedent basis. Claim 15, line 1, the phrase "said plurality of semiconductor devices" has no antecedent basis. Appropriate correction is required.
5. Claims 2, 4 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Fig. 9B shows the catalyst pad [16] is isolated from the gate electrode [25]. It is unclear why claim 2 discloses a catalyst pad electrically coupling said conductive carbon nanotube with said gate electrode.

Claim 4, lines 2-3, the phrase "a plurality of semiconducting carbon nanotubes extending vertically at a location adjacent to said vertical sidewall of said gate electrode"

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is vague and indefinite as to how a plurality of semiconducting carbon nanotubes extending vertically at only one location adjacent to said vertical sidewall of said gate electrode. Are the plurality of semiconducting carbon nanotubes extending vertically at a plurality of locations adjacent to said vertical sidewall of said gate electrode?

Claim 17, line 2, the phrase "said gate electrode of said plurality of semiconductor devices" is unclear whether it is being referred to "said gate electrode of each of said plurality of semiconductor devices".

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1-8 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Roesner et al. (in the IDS filed on 9/19/05).

In regards to claim 1, Roesner et al. show all the elements of the claimed invention in fig. 1C. It is a semiconductor device structure [100], comprising: a gate electrode [104] including a vertical sidewall and a gate dielectric [109] covering the vertical sidewall; at least one semiconducting carbon nanotube [108] extending vertically between opposite first and second ends at a location adjacent to said vertical sidewall of said gate electrode; a first contact [102] electrically coupled with said first end of said at least one

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semiconducting carbon nanotube; and a second contact [110] electrically coupled with said second end of said at least one semiconducting carbon nanotube.

In regards to claim 2, Roesner et al. further disclose a catalyst pad [107] electrically coupling said semiconducting carbon nanotube, the catalyst pad participating in the synthesis of said semiconducting carbon nanotube.

In regards to claim 3, Roesner et al. further disclose said at least one semiconducting carbon nanotube is a single-wall semiconducting carbon nanotube (paragraph [0068]).

In regards to claim 4, Roesner et al. further disclose a plurality of semiconducting carbon nanotubes [108] extending vertically at a location adjacent to (close to) said vertical sidewall of said gate electrode [104].

In regards to claim 5, Roesner et al. further disclose said first contact includes a catalyst pad [107] characterized by a catalyst material effective for growing said at least one semiconducting carbon nanotube.

In regards to claim 6, Roesner et al. further inherently disclose said first end of said at least one semiconducting carbon nanotube incorporates an electrical-conductivity enhancing substance (the catalyst material) diffused from said catalyst pad into said first end during growth because the catalyst material (metal) would diffuse into carbon during the nanotubes fabrication process.

In regards to claim 7, Roesner et al. further disclose an insulating layer [103] disposed between said first contact and said gate electrode for electrically isolating said first contact from said gate electrode.

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In regards to claim 8, Roesner et al. further disclose an insulating layer [109] disposed between said second contact and said gate electrode for electrically isolating said second contact from said gate electrode.

8. Claims 14-16, 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: The major difference in the claims not found in the prior art of record is a circuit comprising an interconnected plurality of semiconductor device structures of claim 1 arranged in an array characterized by a plurality of rows and a plurality of columns.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (571) 272-1657. The examiner can normally be reached on 8:20 am to 5:50 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

sl  
October 30, 2005

A handwritten signature in black ink, appearing to read "Steven Loh". The signature is written in a cursive, flowing style.